

**WHAT IS CLAIMED IS:**

1. A method of tracking earliest pilot phase offsets for geo-location determination comprising:

determining search window limitations for one or more sectors due to cell coverage area and due to mobile station dynamics; and

searching for earliest pilot phase offsets of the sectors using the determined search windows.

2. The method of Claim 1, further comprising: determining search window offsets for each of the one or more sectors based on the relative phase offset between pilots of sectors.

3. The method of Claim 1, wherein determining search window limitations further comprises determining an earliest point in time of the window as earlier than the latest of the line-of-sight or earliest path times from a set of sectors by a cell size based factor or speed based factor.

4. The method of Claim 1, wherein determining search window limitations further comprises determining a latest point in time of the window as later than the earliest of the line-of-sight or earliest path times from a set of sectors by a cell size based factor or speed based factor.

5. The method of Claim 1, further comprising setting the search window size asymmetrically from an early and a late side.

6. The method of Claim 1, further comprising setting an early side of the search window based on cell size and speed of a mobile station.

7. The method of Claim 1, further comprising setting a later side of the search window based on a speed of a mobile station.

8. The method of Claim 1, further comprising transmitting cell size based limitations to a mobile station.

9. The method of Claim 8, further comprising embedding the cell size based limitations in overheads or other messages.

10. The method of Claim 1, further comprising using results of phase measurements in position location algorithms.

11. A mobile station for use in a wireless communication system comprising a processor which determines search window limitations for one or more sectors due to cell coverage area and due to the mobile station dynamics, wherein the mobile station searches for an earliest pilot phase offsets of the sectors using the determined search windows.

12. The mobile station of Claim 11, wherein the processor determines search window offsets for each of the one

or more sectors based on the relative phase offset between pilots of sectors.

13. The mobile station of Claim 12, wherein the processor further determines search window limitations by determining an earliest point in time of the window as earlier than the latest of the line-of-sight or earliest path times from a set of sectors by a cell size based factor or speed based factor.

14. The mobile station of Claim 12, wherein the processor further determines search window limitations by determining a latest point in time of the window as later than the earliest of the line-of-sight or earliest path times from a set of sectors by a cell size based factor or speed based factor.

15. The mobile station of Claim 11, wherein the search window size is set asymmetrically from an early and a late side.

16. The mobile station of Claim 11, wherein an early side of the search window is set based on cell size and speed of the mobile station.

17. The mobile station of Claim 11, wherein a later side of the search window is set based on a speed of the mobile station.

18. The mobile station of Claim 11, wherein the mobile station receives cell size based limitations.

19. The mobile station of Claim 18, wherein the cell size based limitations are embedded in overheads or other messages.

20. The mobile station of Claim 11, wherein the results of phase measurements are input to position location algorithms.

21. A wireless communication system which tracks earliest pilot phase offsets for geo-location determination comprising:

one or more base stations, each of the one or more base stations serving a cell divided into one or more sectors; and

a mobile station which determines search window limitations for the one or more sectors due to the cell coverage area and due to mobile station dynamics, wherein the mobile station searches for the earliest pilot phase offsets of the one or more sectors using the determined search windows.

22. The wireless communication system of Claim 21, wherein the mobile station determines search window offsets for each of the one or more sectors based on the relative phase offset between pilots of sectors.

23. The wireless communication system of Claim 22, wherein the mobile station further determines search window limitations by determining an earliest point in time of the window as earlier than the latest of the line-of-sight or earliest path times from a set of sectors by a cell size based factor or speed based factor.

24. The wireless communication system of Claim 22, wherein the mobile station further determines search window limitations by determining a latest point in time of the window as later than the earliest of the line-of-sight or earliest path times from a set of sectors by a cell size based factor or speed based factor.

25. The wireless communication system of Claim 21, wherein the search window size is set asymmetrically from an early and a late side.

26. The wireless communication system of Claim 21, wherein an early side of the search window is set based on cell size and speed of the mobile station.

27. The wireless communication system of Claim 21, wherein a later side of the search window is set based on a speed of the mobile station.

28. The wireless communication system of Claim 21, wherein the mobile station receives cell size based limitations.

29. The wireless communication system of Claim 28, wherein the cell size based limitations are embedded in overheads or other messages.

30. The wireless communication system of Claim 21, wherein the results of phase measurements are input to position location algorithms.

31. A method of improving geo-location measurements in a wireless communication system comprising:

computing a set of parameters;

transmitting the set of parameters to a mobile station; and

modifying a geo-location search based on the set of parameters.

32. The method of Claim 31, further comprising determining the speed of the mobile station.

33. The method of Claim 31, further comprising using infrastructure location information to determine the parameters.

34. The method of Claim 33, further comprising dividing the location information into cell sectors.

35. The method of Claim 31, further comprising identifying each cell sector by number.

36. The method of Claim 31, further comprising modifying search parameters when performing geo-location searches.

37. A method for modifying geo-location searches in a wireless communication system comprising:

determining a set of parameters; and

modifying a search window size and offset based on the set of parameters.

38. The method of Claim 37, further comprising computing the speed of the mobile station to obtain the set of parameters.

39. The method of Claim 38, further comprising determining infrastructure information to estimate neighbor timing data.

40. The method of Claim 29, further comprising dividing the cell into sectors, wherein each sector has specific neighbor timing information.

41. The method of Claim 37, further comprising computing the set of parameters at the base station.

42. The method of Claim 37, further comprising detecting the line-of-sight path to determine the geo-location information.

43. The method of Claim 37, further comprising transmitting the set of parameters to a mobile station.

44. The method of Claim 43, further comprising modifying a search window based on the set of parameters when performing a geo-location search.

45. A wireless communication system comprising:

a plurality of base stations which calculate a set of parameters for geo-location searches; and

a mobile station which performs geo-location searches with one or more of the plurality of base stations, wherein the mobile station receives the parameter set from the plurality of base stations and modifies the geo-location searches based on the parameter set.

46. The wireless communication system of Claim 45, wherein the mobile station further determines search window limitations by determining an earliest point in time of the window as earlier than the latest of the line-of-sight or earliest path times from a set of sectors by a cell size based factor or speed based factor.

47. The wireless communication system of Claim 45, wherein the mobile station further determines search window limitations by determining a latest point in time of the window as later than the earliest of the line-of-sight or earliest path times from a set of sectors by a cell size based factor or speed based factor.



48. The wireless communication system of Claim 45, wherein the mobile station modifies the geo-location search based on the speed of the mobile station.

49. The wireless communication system of Claim 45, wherein the mobile station modifies the window size and offset.

50. The wireless communication system of Claim 45, wherein the set of parameters incorporates infrastructure location information.

51. The wireless communication system of Claim 50, wherein the infrastructure location information is divided by sectors.